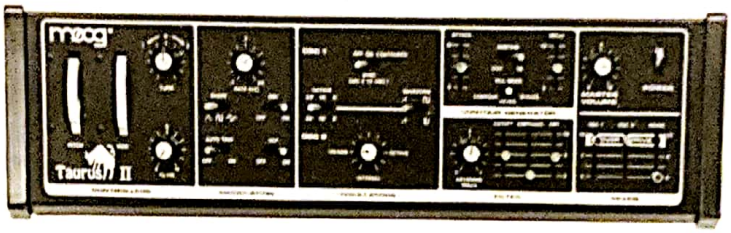
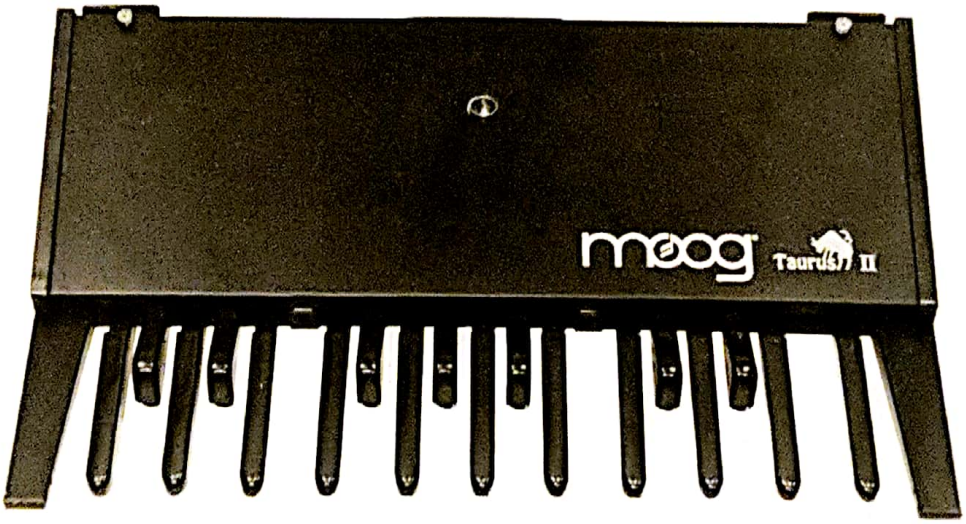
MANUAL NO. 993-045394-003

TECHNICAL SERVICE INFORMATION for

moog® Taurus II



MODEL 343 A



MODEL 343 B

CAUTION

These servicing instructions are for use by qualified personnel only. To avoid risk of electric shock, do not perform any servicing other than that described in the Owner's Manual unless you are qualified to do so. Refer all servicing to qualified service personnel.

MOOG MUSIC INC.
2500 Walden Avenue, Buffalo, New York 14225

MOOG MUSIC
p/a Waalhaven Zuid Zijde 48, 3088 HJ, Rotterdam, The Netherlands

These drawings and specifications are the property of Moog Music Inc., and shall not be reproduced or copied in whole or in part as the basis for manufacture or sale of the items.

COPYRIGHT – 1982
MOOG MUSIC INC.

SPECIFICATIONS

> **NOTE**
>
> All specifications are typical and may vary slightly from unit to unit.

POWER REQUIREMENTS

Operating Voltage Input to Instrument	24 volts AC nominal, 28 volts AC maximum; 50-60 Hertz
Power Consumption	6 watts

CONTROLLERS

Keyboard	18 note (C to F)
GLIDE control	Linear, continuously variable from 5 msec to 2.3 sec
TUNE Control	+/- 3 semitones
MODULATION RATE Control	.3Hz to 31Hz
MODULATION SHAPE Switch	Triangle, Square or Sample and Hold
OSC MODULATION Amount	Zero to 18 semitones
VFC MODULATION Amount	Zero to 4 octaves
PITCH WHEEL Range	+/- 7 semitones

OSCILLATORS

Reference frequency for Low F (Octave = 32')

OSC 1	32.7 Hz
OSC 2	32.7 Hz

WAVEFORMS

OSC 1	Sawtooth and 50% duty cycle; Square wave
OSC 2	Sawtooth and 85% duty cycle; Pulse wave

OCTAVES

OSC 1 and OSC 2	32', 16', 8'
SYNC OSC 2 TO OSC 1, ON	Locks the fundamental frequency of OSC 2 to OSC 1; INTERVAL control sweeps OSC 2 four octaves
SYNC OSC 2 TO OSC 1, CONTOURED	Locks the fundamental frequency of OSC 2 to OSC 1; Contour envelope sweeps OSC 2 through the CONTOUR AMT Control (four octaves)
OSC 2 INTERVAL Control	16 semitones

CONTOUR GENERATOR

ATTACK Time

Minimum	4 milliseconds
Maximum	6 seconds

DECAY Time

Minimum	10 milliseconds
Maximum	20 seconds

Sustain Level at U12B with Key depressed and SUSTAIN Switch IN	4.8 volts

VOLTAGE CONTROLLED FILTER (VCF)

Type: Patented 24dB/octave low pass filter

KEYBOARD TRACKING	Zero to 100% of keyboard control voltage effects the filter cutoff
Regeneration Frequency with FILTER CUTOFF Control centered, KEYBOARD TRACKING min., CONTOUR AMT min.	740Hz
Range of FILTER CUTOFF Control	11 octaves
FILTER CONTOUR AMT Range	6.3 octaves

VOLTAGE CONTROLLED AMPLIFIER (VCA)

(All outputs measured at AUDIO OUT)

OSC 1 Sawtooth	- 2dB
OSC 2 Sawtooth	- 2dB
NOISE	+6dB

REAR PANEL I/O

KEYBOARD IN	1 volt per octave
KEYBOARD OUT	1 volt per octave
S-TRIGGER IN	Short to ground triggers CONTOUR GENERATOR
S-TRIGGER OUT	Shorts J2 pin 5 to ground when key is depressed
V-TRIGGER IN	+3 to 10 volt gate triggers CONTOUR GENERATOR
V-TRIGGER OUT	+10 volts when key is depressed
AUDIO IN	Signal is processed by VCF and VCA; 18K input impedance

SIGNAL TO NOISE RATIO

Bleedthrough (all levels down, MASTER VOL max)	50dB

WEIGHTS AND DIMENSIONS

Synthesizer Dimensions	21" wide x 6-3/4" deep x 4-3/8" high (53cm x 17cm x 11cm)
Synthesizer Weight	7 pounds (3.2kg)

> **NOTE**
>
> All adjustments may be accomplished WITHOUT disassembly and are accessible through the rear panel holes using a 1/8-inch (3mm) screw driver. DO NOT use excessive force when inserting screw driver or damage to trim pot may result.

DISASSEMBLY PROCEDURE

> **NOTE**
>
> Before proceding with disassembly, take care to protect finished plastic and metal parts from sharp objects. Use carpeted or similarly protected surface.

SYNTHESIZER UNIT

REMOVING BASE

Base removal is accomplished by removing seven (7) self tapping screws on the bottom of the unit.

REMOVING CONTROL BOARD 1 AND POWER SUPPLY BOARD 2

Remove all rotary and slide pot knobs. Remove the four (4) 3/8 nuts and finishing washers from the phone jacks on the rear panel. Release Board 2 from the rear panel. Remove the three (3) screws securing the front of Board 1 to housing. Remove the three (3) screws from the rear panel which secure the printed circuit board guide.

Remove P.C. Boards 1 and 2 together. Disconnect keyboard and left hand control connectors. Reconnect prior to reassembly of P. C. Boards into housing.

> **NOTE**
>
> During assembly, the switch levers must be placed in a mechanically centered position to clear the front panel mounting holes. This center position may be unrelated to the actual switch operating positions. Board 1 and Board 2 are hard wired together; avoid excessive flexing of wire solder connections.

BASS PEDAL UNIT

BOTTOM COVER REMOVAL

Removal of bottom cover is accomplished by removing eight (8) No. 6 self tapping screws (4 on bottom, 2 each on front and rear). This allows access to pedal suspension components and pedal switch actuator adjustment tabs.

TOP ENCLOSURE REMOVAL

Removal of top enclosure is accomplished by removing thirteen (13) No. 8 self tapping screws (4 from top near stand mount, 4 from bottom across front and 5 from rear of unit). Tilt enclosure back on to rear panel to expose (3) keyboard switch P.C. Boards, switch actuators and contacts.

PEDAL REMOVAL

Pedal Cap removal is accomplished by removing one (1) No. 8 sheet metal screw at top rear and one (1) machine screw together with the rubber foot under front of pedal. Pedal channel is removed by removing two (2) 1/4-20 shoulder bolts, two (2) white felt pivot washers at front, one (1) white and one (1) red felt guide washer at rear and compression spring.

SWITCH P.C. BOARD REMOVAL

Each switch P.C. Board is retained by two (2) No. 8 screws. Carefully unlock 4 position connector and slide P.C. assembly to side for removal. Removal of center P.C. Board requires removal of either left or right P.C. Board. Take care not to damage switch contact springs. Ensure contact springs are properly positioned relative to the plastic actuator on the pedal channel upon reassembly.

SWITCH CONTACT ADJUSTMENT

Adjustment of switch actuator position is accomplished by bending tab located at rear of pedal channel. Insert a flat blade screwdriver into slot provided in tab to adjust height of actuator.

Switch contact springs are located just above the pedal channel with one spring positioned inside the slot in the plastic actuator and the other directly above the actuator. Repair of a single switch can be made by removing two (2) pedal suspension bolts and pedal channel. For more extensive repair, remove top enclosure for access to switch P.C. Boards, spring contacts and actuators.

ALIGNMENT PROCEDURE

> **NOTE**
>
> Synthesizer alignment procedure must be performed with intended bass pedal keyboard as a matched set.

All trim adjustments can be made without opening the unit. This is done by using the trimpot access holes, the KEYBOARD IN/OUT jack and the AUDIO OUT jack which are located on the back of the unit. Allow unit to warm up for about 15 minutes before making these adjustments.

KEYBOARD SCALE ADJUSTMENT

Set GLIDE control R13 at minimum.

Use DVM to monitor voltage at the tip of the KEYBOARD IN/OUT jack J1.

Alternately depress low F and high C keys.

Adjust "Keyboard Scale Trim" R24 for a 1.41 VDC difference to achieve a 1 volt/octave scale factor.

OSCILLATOR 1 SCALE, FREQUENCY AND HI END ADJUSTMENTS

Set the following controls:

MASTER VOLUME, R148	Maximum
OSC 1 LEVEL, R116	Maximum

OSC 2 & NOISE LEVEL, R118 & R120	Minimum
FILTER CUTOFF, R68	Maximum
FILTER EMPHASIS, R129	Minimum
FILTER CONTOUR AMT, R66	Minimum
VCA MODE, SW9	Bypass
OSC SYNC, SW6	Off
OCTAVE, SW4	32'
OSC WAVEFORM, SW7	Sawtooth
OSC 2 INTERVAL, R86	Unison
OSC, VCF MODE, SW2, SW5	Off
TUNE, R16	Centered
PITCH WHEEL, R160	Centered

Center the following trimpots:
"Range 1 Trim" R58
"Scale 1 Trim" R54
"Osc 1 Hi-End Trim" R97

Monitor the audio output frequency at the AUDIO OUT jack J5.

Depress and hold low C. Using "Range 1 Trim" R58, adjust OSC 1 for 32Hz.

Depress and hold high C. Using "Scale 1 Trim" R54, adjust OSC 1 for 65Hz.

Repeat two previous steps until a perfect one octave spread is obtained.

Change OCTAVE switch SW4 to 8'.

Depress and hold low C. Adjust "Octave Trim" R155 for 65Hz.

Depress high C and adjust "Hi-End Trim" R97 for 130Hz.

Repeat two previous steps until a perfect one octave spread is obtained.

Repeat above steps as required until tuning is satisfactory on all ranges.

OSCILLATOR 2 SCALE, FREQUENCY AND HI END ADJUSTMENTS

Set the controls as in OSC 1 tune up procedure except as indicated below:

OSC 1 LEVEL, R116	Minimum
OSC 2 LEVEL, R118	Maximum

Center the following trimpots:
"Range 2 Trim" R51
"Scale 2 Trim" R48
"Osc 2 Hi-End Trim" R72

Monitor the audio output at the AUDIO OUT jack, J5.

Depress and hold low C. Using "Range 2 Trim" R51, adjust OSC 2 for 32Hz.

Depress and hold high C. Using "Scale 2 Trim" R48, adjust OSC 2 for 65Hz.

Repeat two previous steps until a perfect one octave spread is obtained.

Change OCTAVE switch SW4 to 8'.

Depress and hold low C and adjust "Range 2 Trim" R51 for 65Hz.

Depress and hold high C and adjust "Osc 2 Hi-End Trim" R72 for 130Hz.

Repeat two previous steps until a perfect one octave spread is obtained.

Repeat above steps as required until tuning is satisfactory on all ranges.

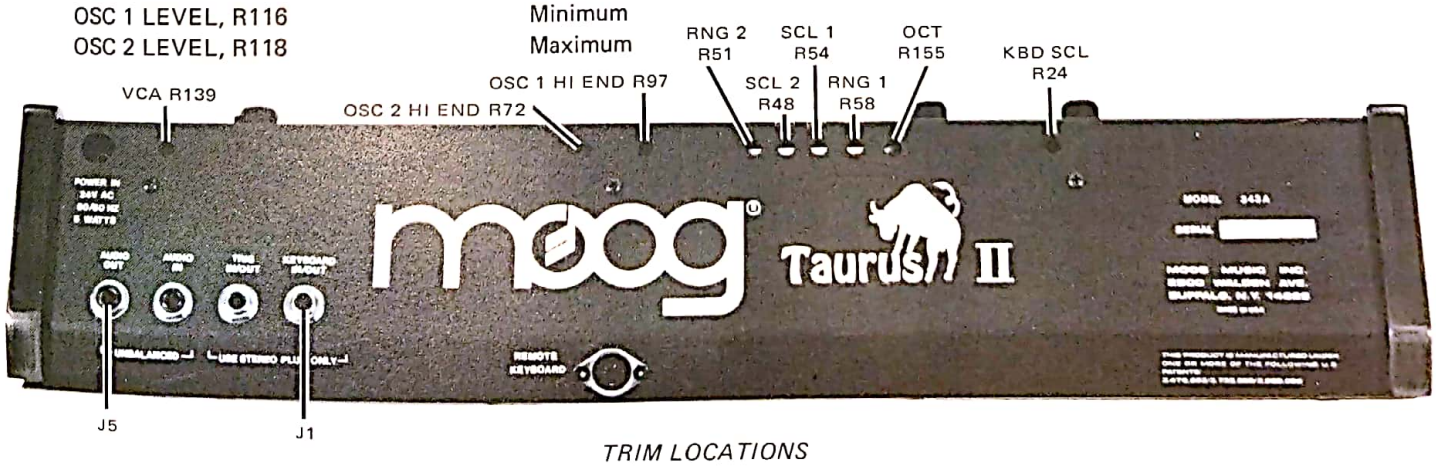
VCA BALANCE ADJUSTMENTS

Set the following controls:

MASTER VOLUME, R148	Maximum
OSC 1 LEVEL, R116	Minimum
OSC 2 LEVEL, R118	Minimum
NOISE LEVEL, R120	Minimum
VCA MODE, SW9	Keyed
FILTER CUTOFF, R68	Maximum
FILTER EMPHASIS, R129	Minimum
FILTER CONTOUR AMT, R66	Minimum
MODULATION RATE, R43	30
AUTO TRIG, SW1	On

Monitor at the AUDIO OUT jack J5.

Adjust "VCA Trim" R139 for minimum output level.



TRIM LOCATIONS

MECHANICAL REPLACEMENT PARTS LIST

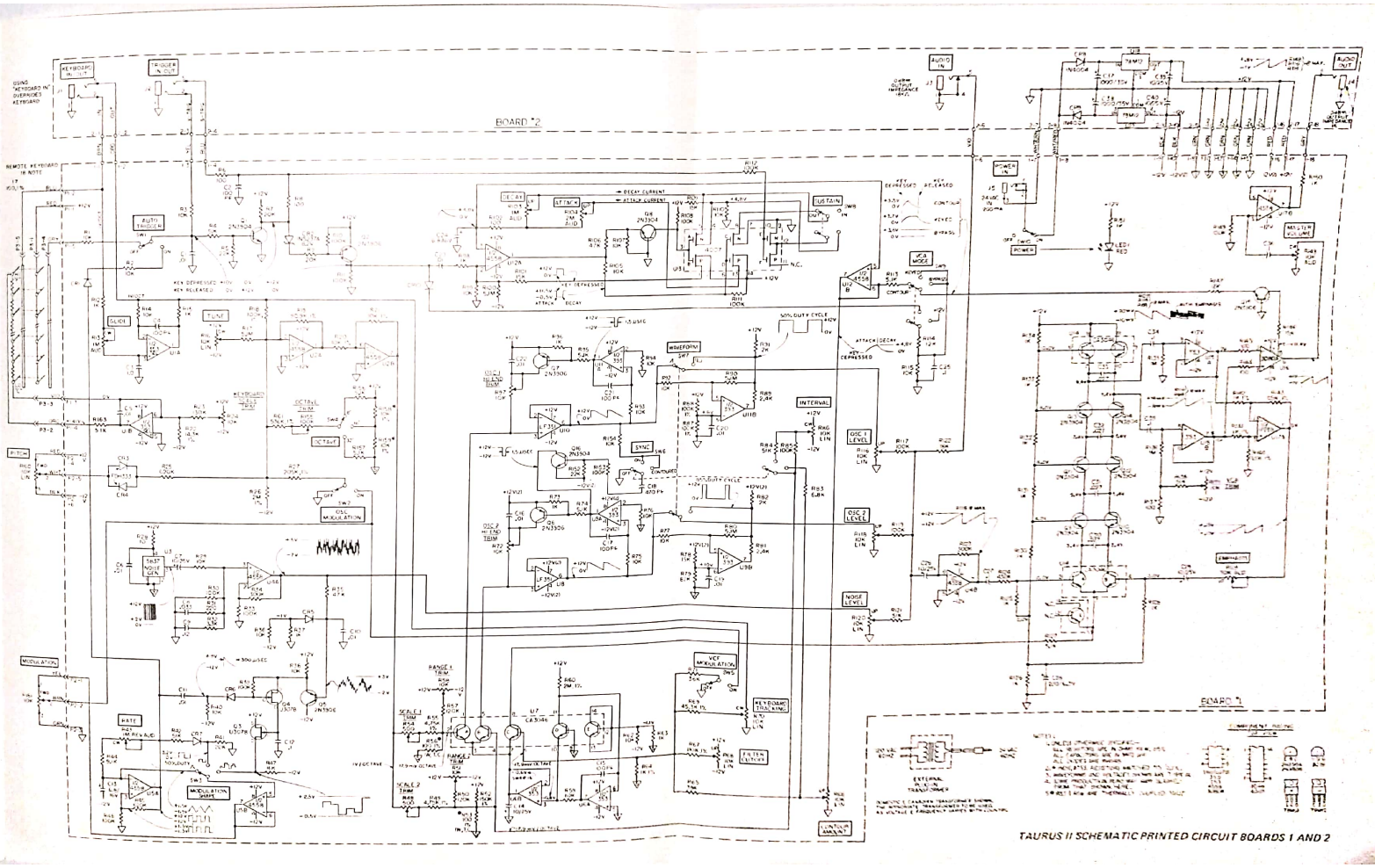
REF DESIG	DESCRIPTION	PART NO.
	P.C. Board Assembly, Synth.	996-045367-002
	P.C. Board Assembly, Keyboard, Left	996-045431-001
	P.C. Board Assembly, Keyboard, Center	996-045431-002
	P.C. Board Assembly, Keyboard, Right	996-045431-003
	Bass Pedal Keyboard Assembly	979-045445-001
	Pedal Cap, Black	915-003863-000
	Pedal Cap, Brown	915-003856-000
	Actuator, Switch	964-030990-000
	Contact, Spring	917-030494-000
	Buss Bar Assembly	997-032370-000
	Bolt, Shoulder, Front	903-027479-000
	Bolt, Shoulder, Rear	903-027482-000
	Washer, Pivot	904-005076-000
	Washer, Guide	904-025503-000
	Spring, Compression	975-027479-000
	Stand Assembly (MSC)	935-045620-001
	Flange, Stand, 5/8-27 (AD-11)	962-045428-001
S1	Connector, CIS, Socket Housing, 5 Pin	906-040298-005
S2	Connector, CIS, Socket Housing, 6 Pin	906-040298-006
S3	Connector, DIN, 5 Pin	910-045322-005
	Seal, Foam, Front Panel, Left	914-045372-001
	Seal, Foam, Front Panel, Right	914-045373-001
	Grommet, Power Plug	977-045386-001
	Wheel Assembly	997-041597-001
	Detent, Spring	961-041178-001
	Detent, Teflon	962-041179-001
	Knob, Slide Pot, Assembly, Blue Insert	915-040272-951
	Knob Assembly, Skirted, Clear Spun Aluminum	915-042764-943
R161	Resistor, Rotary Control, MOD WHEEL, 10K, Special Taper	925-040269-001
R160	Resistor, Rotary Control, PITCH WHEEL, Linear, 10K	925-040930-003
	Cabinet Assembly	967-045358-941
	Base	967-045429-001
	Foot, Rubber, 5/8 in. dia. x 5/16	916-045475-001
	Transformer, Plug-In, 120V, 50/60Hz	935-045370-001
	Transformer, Plug-In, 220V, 50/60Hz	935-045385-001
	Stand Assembly, Telescoping	935-045620-001

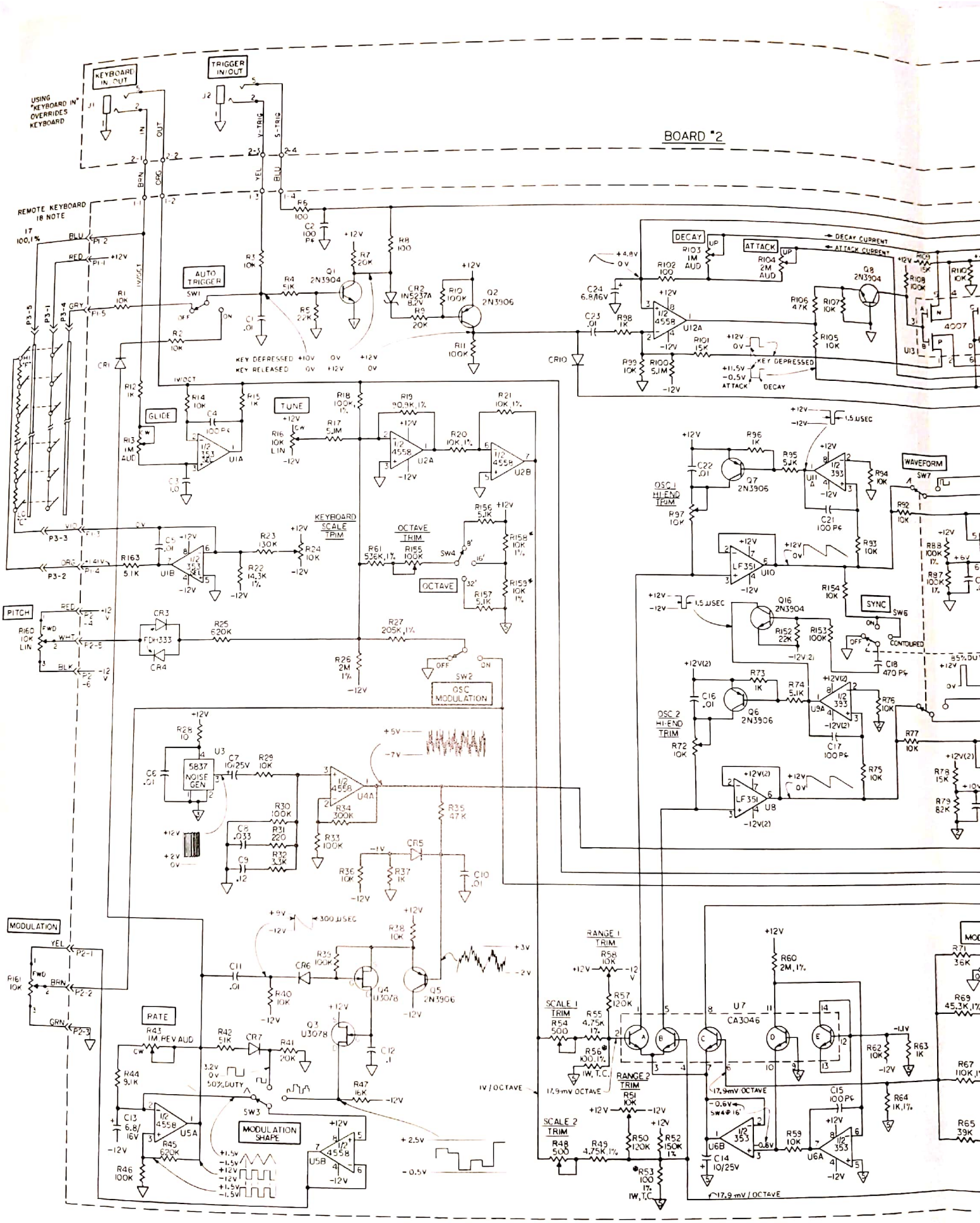
PRINTED CIRCUIT BOARD ASSEMBLY SELECTED REPLACEMENT PARTS LIST

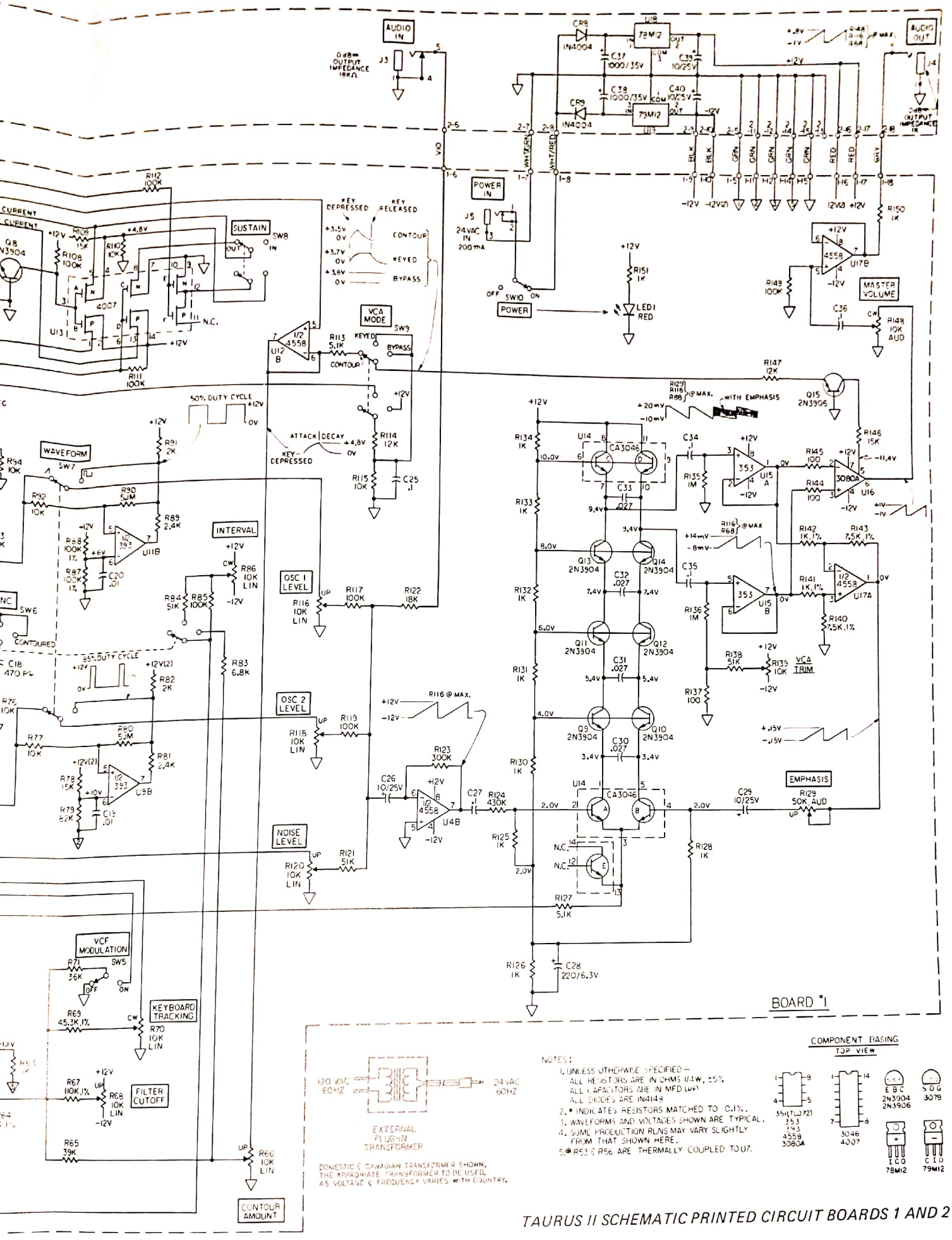
REF DESIG	DESCRIPTION	PART NO.
L1	LED, Red, High Intensity	939-041850-004
CR1, CR5, CR6, CR7, CR10	Diode, Signal, 1N4148	919-041075-001
CR2	Diode, Zener, 8.2 Volt, 1N5237A	919-041349-004
CR3, CR4	Diode, Low Leakage, FDH333	919-044466-001
CR8, CR9	Diode, Rectifier, 1N4004	919-042019-001

PRINTED CIRCUIT BOARD ASSEMBLY SELECTED REPLACEMENT PARTS LIST (Continued)

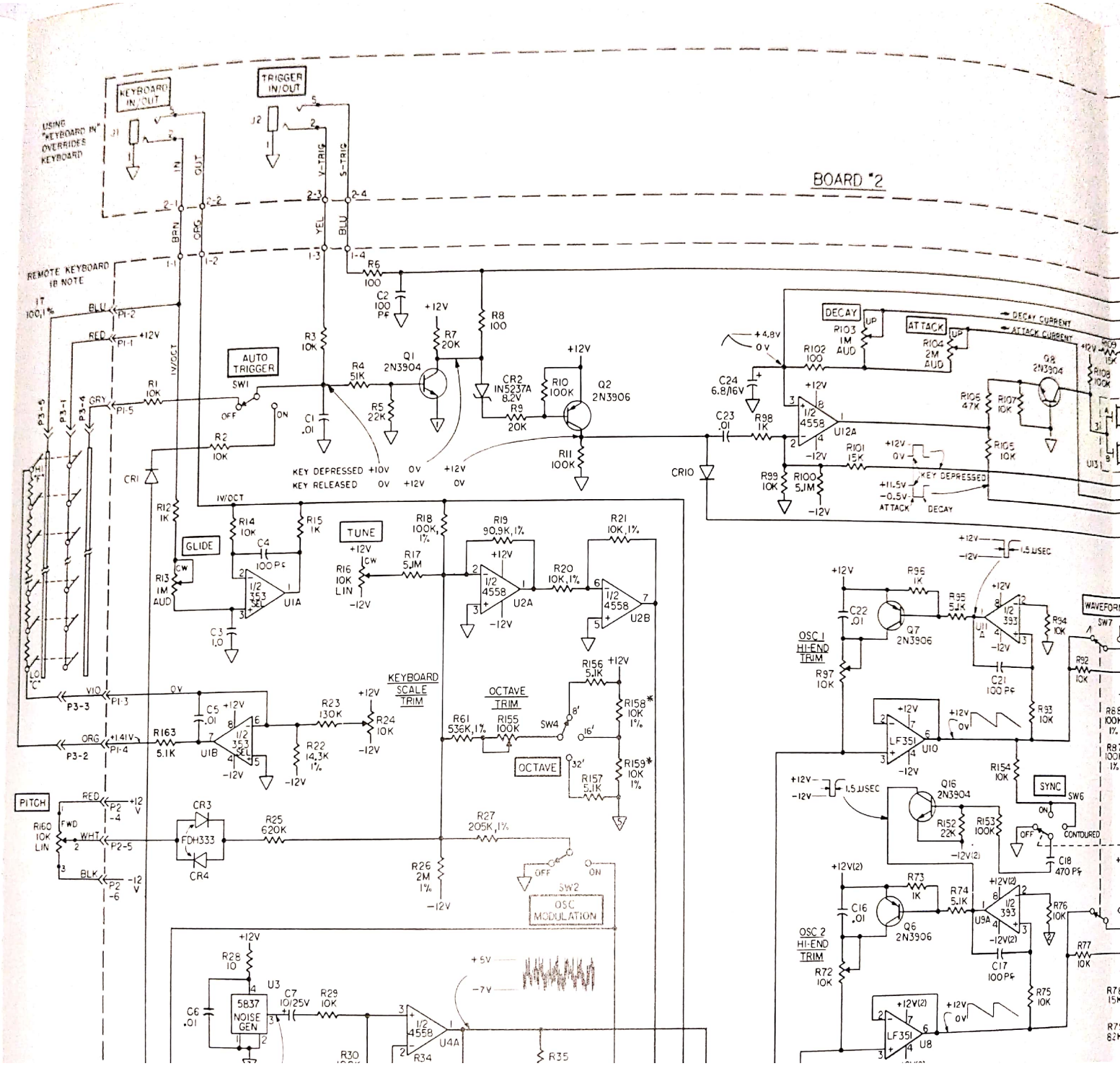
REF DESIG	DESCRIPTION	PART NO.
C7, C14, C24, C39, C40	Capacitor, Alum. Elect., 10ufd, 25V	945-044465-003
C13, C24	Capacitor, Low Leakage, Alum. Elect., 6.8ufd, 16V	945-045049-001
C28	Capacitor, Alum. Elect., 220ufd, 6.3V	945-040209-003
C37, C38	Capacitor, Alum. Elect., 1000ufd, 35V	945-040209-011
R13	Resistor, Rotary, Audio, 1 Meg	925-045012-004
R16, R24, R72, R97, R139	Resistor, Carbon Trim, Vertical Mount, 10K	925-045364-001
R43	Resistor, Rotary, Rev. Audio, 1 Meg	925-045012-005
R48, R54	Resistor, Cermet Trim, Vertical Mount, 500Ω	925-042526-006
R155	Resistor, Cermet Trim, Vertical Mount, 100K	925-042526-005
R51, R58	Resistor, Cermet Trim, Vertical Mount, 10K	925-042526-003
R53, R56	Resistor, 1 Watt +/- 1%, Temp. Comp., 100Ω	924-040183-002
R66, R68, R120	Resistor, Slide, Linear, 10K	925-045013-001
R70, R86	Resistor, Rotary, Linear, 10K	925-045012-001
R103, R104	Resistor, Slide, Audio, 1 Meg	925-045013-002
R116, R118	Resistor, Slide, Linear, 10K	925-045013-001
R129	Resistor, Slide, Audio, 50K	925-045013-004
R148	Resistor, Rotary, Audio, 10K	925-045012-003
	Socket, Component Lead	906-045374-001
	Socket, 7 Pin, SIL	906-040307-007
	Heat Sink	967-040935-001
J1, J2	Jack, Phone, 2 Circuit, Switchcraft 111	910-041306-004
J3	Jack, Phone, Ins. 2 Circuit, Switchcraft N-112	910-041306-007
J4	Jack, Phone, Ins. 2 Circuit, Switchcraft N11	910-041306-006
J5	Jack, Miniature	910-045371-001
SW1, SW2, SW5, SW7, SW8, SW10	Switch, Lever, 2P2T	960-045214-001
SW3, SW4, SW6, SW9	Switch, Lever, 2P3T	960-045216-001
U1	IC, Dual Operational Amplifier, Special, LF353	991-042908-002
U2, U4, U5, U12, U17	IC, Dual Operational Amplifier, 4558	991-041146-001
U3	IC, Noise Generator, 5837	991-042016-001
U6, U15	IC, Dual Operational Amplifier, LF353	991-042908-001
U7, U14	IC, Trans Array, 3046	991-041104-001
U8, U10	IC, Operational Amplifier, LF351	991-042739-001
U9, U11	IC, Dual Voltage Comparator, LM393	991-042388-001
U13	IC, CMOS, Dual Complementary Pair plus Inverter, 4007	991-041086-001
U16	IC, Operational Amplifier, 3080A	991-041089-001
U18	IC, +12 Volt Regulator, 78M12	991-041112-002
U19	IC, -12 Volt Regulator, 79M12	991-044316-001
Q1, Q14, Q16	Transistor, NPN, 2N3904	991-041051-002
Q2, Q5, Q6, Q15	Transistor, PNP, 2N3906	991-041052-002
Q3, Q4	Transistor, N-Channel FET, U3078	991-042659-001

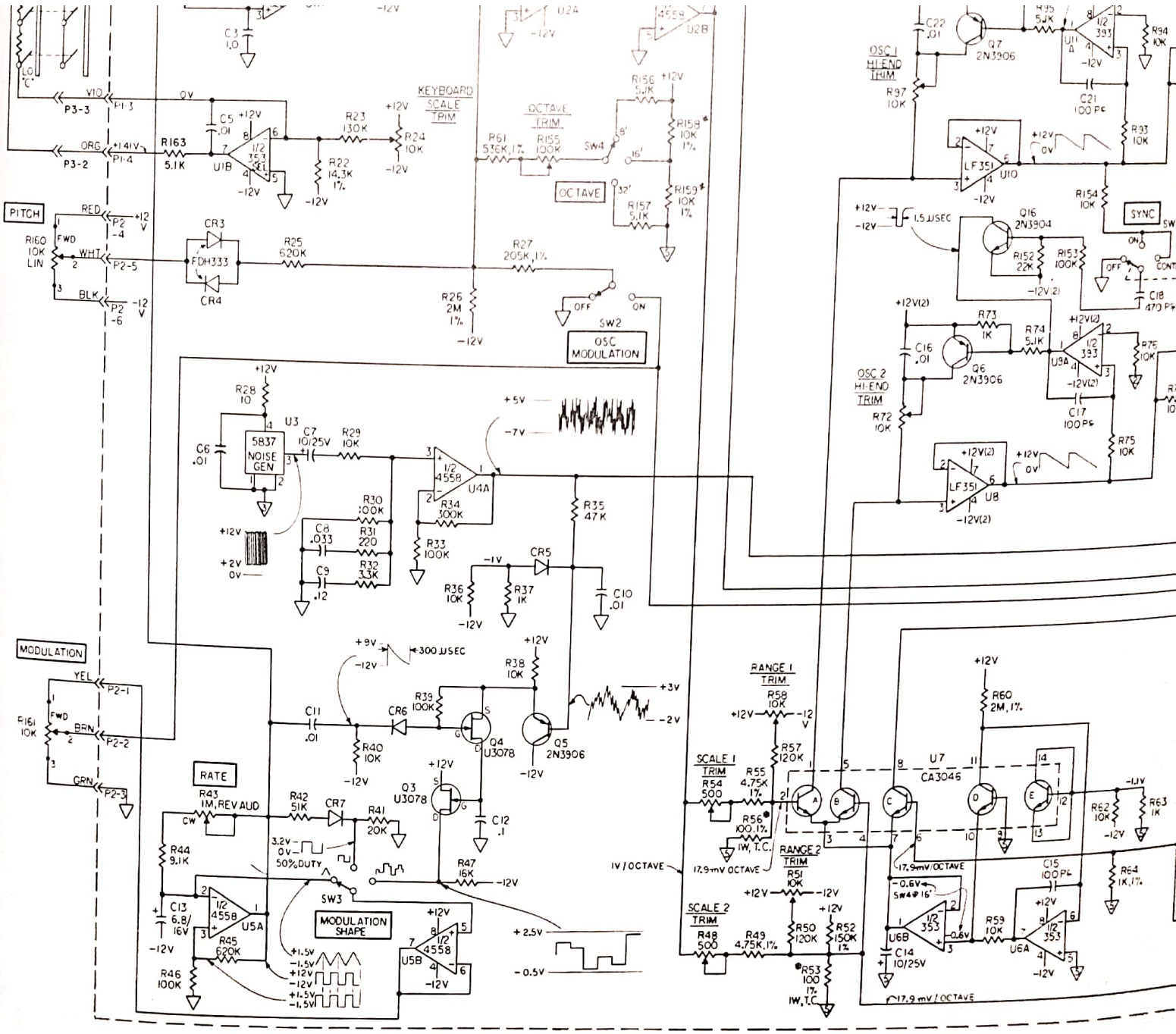

BOARD #2
BOARD #1
KEYBOARD IN
TRIGGER IN
AUDIO IN
AUDIO OUT
POWER IN
POWER
ATTACK
DECAY
SUSTAIN
GLIDE
TUNE
OCTAVE
PITCH
MODULATION
RATE
NOISE LEVEL
OSC 1 LEVEL
OSC 2 LEVEL
INTERVAL
WAVEFORM
SYNC
KEYBOARD TRACKING
FILTER CUTOFF
MASTER VOLUME
TAURUS II SCHEMATIC PRINTED CIRCUIT BOARDS 1 AND 2

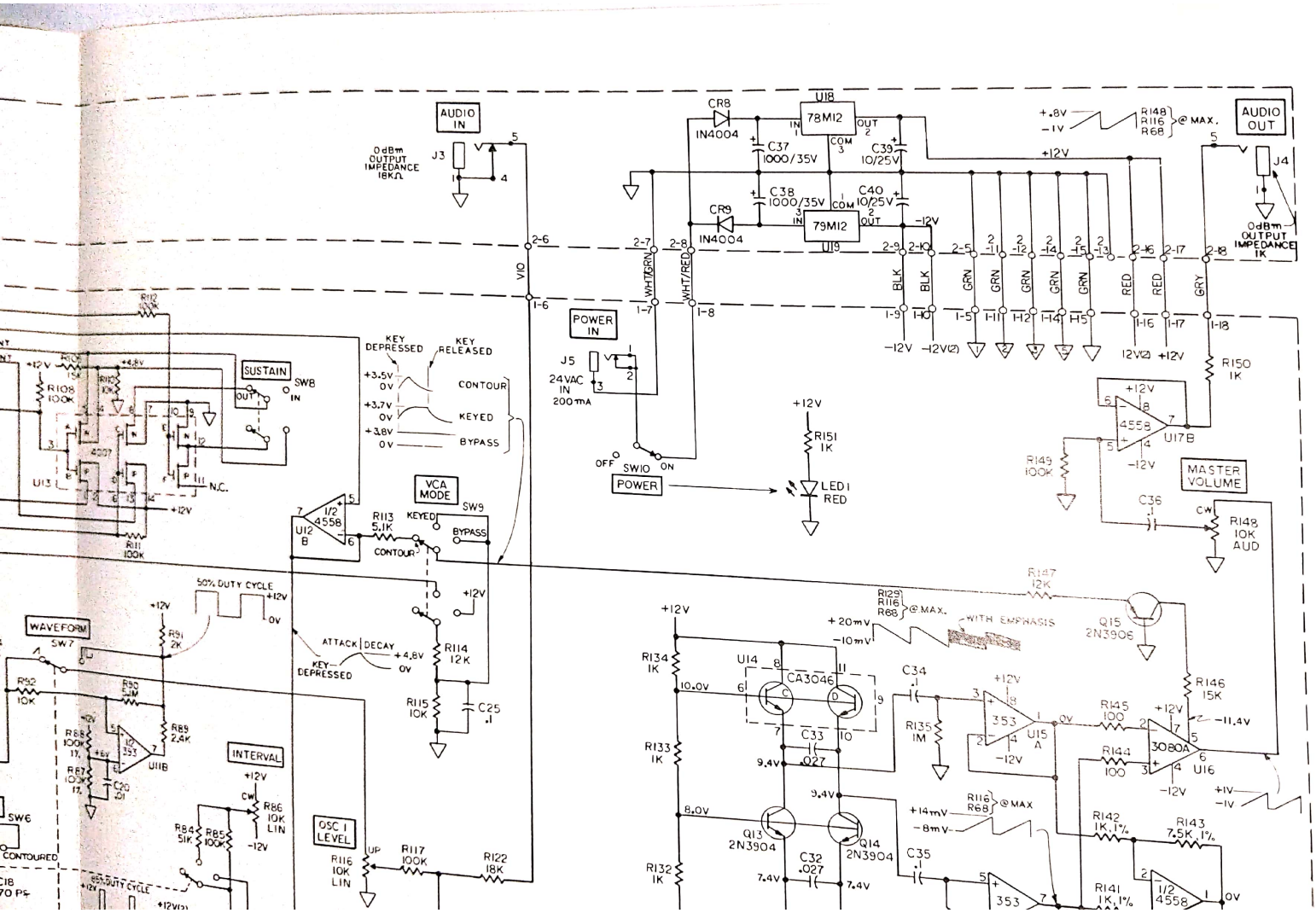

BOARD #2
KEYBOARD IN/OUT
TRIGGER IN/OUT
USING "KEYBOARD IN" OVERRIDES KEYBOARD
REMOTE KEYBOARD IB NOTE
AUTO TRIGGER
GLIDE
TUNE
KEYBOARD SCALE TRIM
OCTAVE TRIM
OCTAVE
PITCH
MODULATION
RATE
MODULATION SHAPE
OSC MODULATION
DECAY
ATTACK
WAVEFORM
SYNC
OSC 1 HI-END TRIM
OSC 2 HI-END TRIM
SCALE 1 TRIM
SCALE 2 TRIM
RANGE 1 TRIM
RANGE 2 TRIM
KEY DEPRESSED +10V 0V +12V 0V
KEY RELEASED 0V 0V +12V 0V
1V/OCTAVE
17.9mV OCTAVE
5837 NOISE GEN
CA3046
LF351
4007

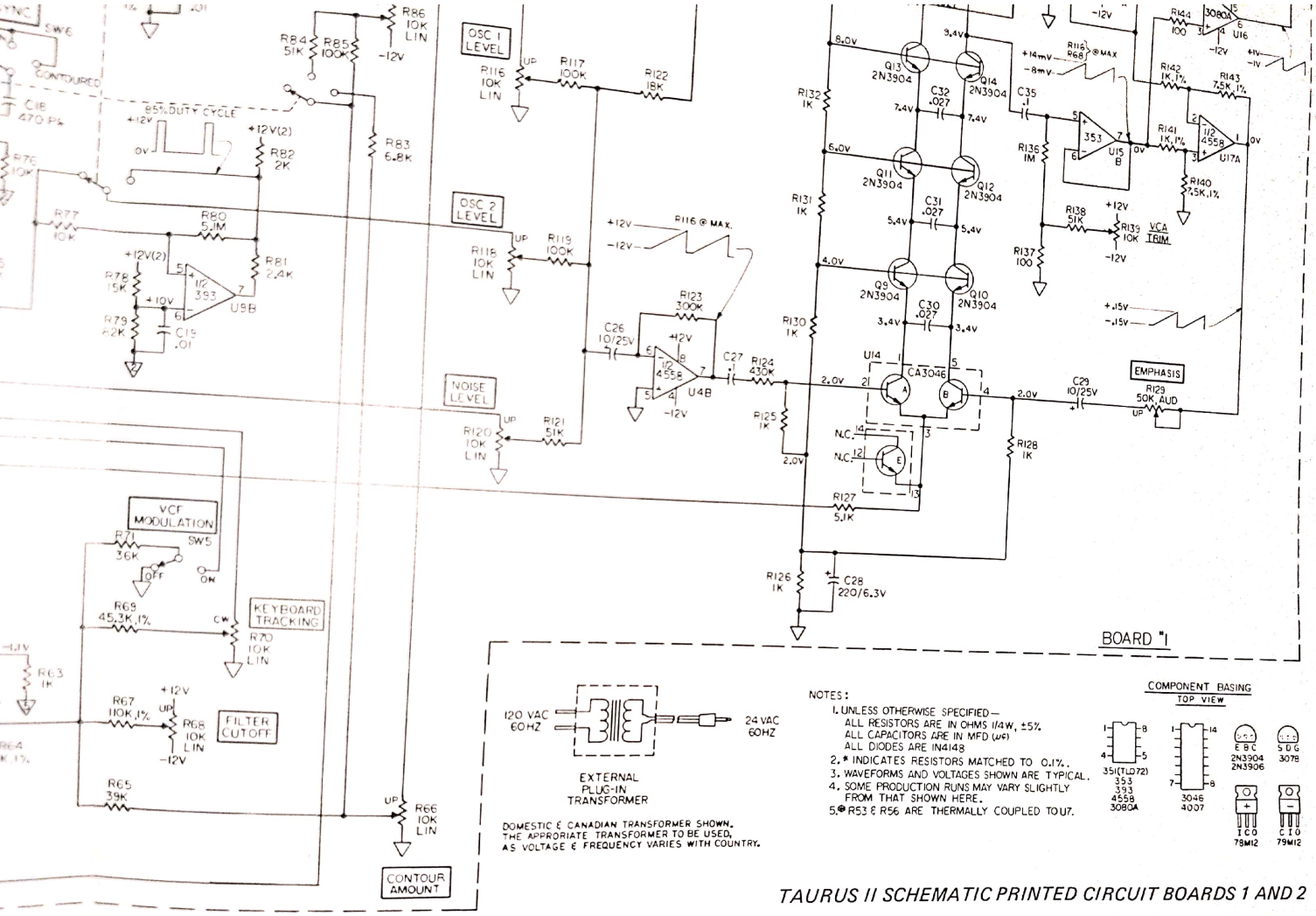


TAURUS II SCHEMATIC PRINTED CIRCUIT BOARDS 1 AND 2


BOARD #2
KEYBOARD IN/OUT
TRIGGER IN/OUT
USING "KEYBOARD IN" OVERRIDES KEYBOARD
REMOTE KEYBOARD (B NOTE)
AUTO TRIGGER
SW1
GLIDE
TUNE
KEYBOARD SCALE TRIM
OCTAVE TRIM
OCTAVE
PITCH
OSC MODULATION
DECAY
ATTACK
DECAY CURRENT
ATTACK CURRENT
KEY DEPRESSED
KEY RELEASED
OSC 1 HI-END TRIM
OSC 2 HI-END TRIM
SYNC
CONTOURED
WAVEFORM
5837 NOISE GEN
LF351
1.5 μSEC


PITCH
MODULATION
RATE
KEYBOARD SCALE TRIM
OCTAVE TRIM
OCTAVE
OSC MODULATION
SW2
SW3
SW4
MODULATION SHAPE
OSC 1 HI-END TRIM
OSC 2 HI-END TRIM
SYNC
RANGE 1 TRIM
RANGE 2 TRIM
SCALE 1 TRIM
SCALE 2 TRIM
5837 NOISE GEN
CA3046
LF351
1V / OCTAVE
17.9mV / OCTAVE


AUDIO IN
0dBm OUTPUT IMPEDANCE 18KΩ
J3
CR8
IN4004
U18
78M12
C37 1000/35V
C39 10/25V
CR9
IN4004
C38 1000/35V
C40 10/25V
79M12
U19
+.8V
-1V
R148 R116 R68 @MAX.
AUDIO OUT
J4
0dBm OUTPUT IMPEDANCE 1K
+12V
-12V
VIO
WHT/GRN
WHT/RED
BLK
BLK
GRN
GRN
GRN
GRN
GRN
RED
RED
GRY
POWER IN
J5
24VAC IN 200mA
OFF SW10 ON
POWER
+12V
R151 1K
LED1 RED
R150 1K
U17B
4558
R149 100K
MASTER VOLUME
C36
R148 10K AUD
KEY DEPRESSED
KEY RELEASED
+3.5V 0V CONTOUR
+3.7V 0V KEYED
+3.8V 0V BYPASS
SUSTAIN
SW8
VCA MODE
SW9
KEYED
BYPASS
U12 B
1/2 4558
R113 5.1K
CONTOUR
R112 100K
R108 100K
R110 10K
R111 100K
4007
U13
N.C.
WAVEFORM
SW7
50% DUTY CYCLE
R91 2K
R92 10K
R90 5.1K
R89 2.4K
R88 100K 1%
R87 100K 1%
U11B
C20 .01
ATTACK DECAY
KEY-DEPRESSED
+4.8V 0V
R114 12K
R115 10K
C25 .1
INTERVAL
R86 10K LIN
R84 51K
R85 100K
OSC I LEVEL
R116 10K LIN
R117 100K
R122 18K
R147 12K
R129 R116 R68 @MAX.
+20mV -10mV
WITH EMPHASIS
Q15 2N3906
R134 1K
R133 1K
R132 1K
U14
CA3046
C33 .027
C32 .027
Q13 2N3904
Q14 2N3904
10.0V
9.4V
8.0V
7.4V
C34 .1
C35 .1
R135 1M
U15 A
353
R145 100
R144 100
R146 15K
3080A
U16
-11.4V
+14mV -8mV
R116 R68 @MAX
R142 1K 1%
R143 7.5K 1%
R141 1K 1%
1/2 4558
0V
+1V -1V



TAURUS II SCHEMATIC PRINTED CIRCUIT BOARDS 1 AND 2